Design and Construction of a Planar and Cylindrical Antenna Measurement System at Polytechnique University of Madrid

J. L. Besada-Sanmartín, M. Sierra-Castañer, P. C. Almena, and J. M. S. Puente
Grupo de Radiación, Dpto. Señales, Sistemas y Radiocomunicaciones
Universidad Politécnica de Madrid., E.T.S.I. Teleocomunicación. Ciudad Universitaria
Madrid, 28040, Spain

Radiation Group of the Polytechnic University of Madrid is mounting a new planar and cylindrical system, which it will be fully available in a few months. The design, construction and evaluation of the planar scanner and the cylindrical system for antenna measurement is presented.

This new system shares the anechoic chamber with a compact range system that has been working for the last seven years. The RF equipment: network analyzer, rotary joints, cables ... has been acquired from different commercial providers. But, the mechanical structure, the position controller and the acquisition and near field — far field transformation field has been implemented at the facilities of the University, so the price of the system has been really low.

The free dimensions for the planar scanner are 4.5 meters by 4.5 meters. The cylindrical system is placed at the middle of the planar scanner. The system will work from 900 MHz until 40 GHz. The maximum diameter of the Antenna Under Test will be 2.5 meters. Everything is fabricated with Aluminium.

The rotors are controlled with commercial encoders. These equipment are controlled by a six axes equipment designed and constructed at the facilities of the University. The equipment is based on a PC (Pentium 200) completed with different commercial cards to control the encoders and to communicate with GP-IB bus.

The software required to control both the positioning system and the RF equipment is designed under Windows environment. This software is completed with the planar near field and cylindrical near field to far field conversions.

The evaluation tests for the whole system has been implemented and the results of this evaluation will be available in March.